Expanding Frontiers of Genetics

A REVIEW

GENETICS IS BECOMING a subject which is gradually pervading the conscious and the subconscious of modern science. We see a repetition of the impact of chemistry sixty years ago when it changed from a separate discipline to a part of virtually all scientific endeavours, so much so that it has almost lost a strict definition of its own. Here are discussed three recently published books on genetics which each, in its own way, enters a wider field of thought.

Professor Penrose[1] has written a book on human genetics for the average person. It is clear that the mechanism of human inheritance is involved in very many everyday problems. Professor Penrose refers specifically to the effect of ionising radiation on hereditary changes by mutation, but genetics equally enters South African politics, the public school problem, or malaria eradication in areas where genes such as the sickle-cell trait afford some protection to the population. Technical terms which present "an unnecessarily forbidding aspect to the uninitiated" are either not used or are explained when their use is unavoidable. Professor Penrose states that it is inevitable that in the future, human genetics will more and more be reduced to problems of chemistry. Indeed, this year's Nobel prizes in Medicine and in Chemistry have been awarded to workers on the chemical and physical structure of the material which transfers genetical information and on the relation of human proteins to these agents of inheritance.

Professor C. H. Waddington's book[2] attempts to turn the thought of geneticists back from polypeptide chains and protein molecules to the form of living matter. He discusses the types of morphogenetic process. There are the unit-generated forms of which the prime example is a crystal of an inorganic compound. From these he proceeds to particle systems to which the crystals of globular molecules belong. There are monomers such as myoglobin, dimers such as insulin and tetramers such as certain abnormal haemoglobins. Other unit-generated systems result in fibres, and in sheets or membranes. There is only a short step from membranes to tubes; double membranes named "didermic" (two-skinned) can be arranged parallel to one another and from these one can easily proceed to flattened vesicles. Midway in complexity between these simple forms and the cell are instruction-generated forms where a number of units are assembled in the immediate neighbourhood of some pre-existing structure whose pattern, like a template, determines their orderly arrangement. These templates may act by coming into operation gradually and letting the final pattern build itself up in stages or they may act with all their parts at once. The latter, the "synchronic" templates, are the most important in biology. Another type of instruction is not by templates but from spatially distributed environmental influences. Here is a book which combines morphology, as one knew it in the 1920s, with present-day chemical genetics.

Professor F. J. Kallmann has edited the proceedings of a Symposium held at the New York State Psychiatric Institute in 1961.[3] There are excellent contributions on basic genetics and on behavioural and psychiatric genetics, as well as genetic studies of mental deficiency and neurological disorders. Of particular importance is the break-through of medical genetics into the field of mental health with contributions on the role of genetics in a medical school curriculum, and reports on trends in psychiatric genetics in England, Scandinavia, South Africa and the United States. There is an extremely useful and exhaustive bibliography. Eliot Slater (who is one of the contributors to this volume) recently remarked in THE EUGENICS REVIEW that one has the feeling that a break-through is "just around the corner" in the combined research on chemistry and psychiatry. This volume leads one

to expect this leap ahead where chemistry, psychiatry and genetics meet.

H. LEHMANN

1. **Penrose, L. S.** *Outline of Human Genetics.* Second Edition. London, Melbourne, Toronto 1963. Heinemann. Pp. xiv + 166. Price 15s.

2. **Waddington, C. H.** *New Patterns in Genetics and Development.* New York and London, 1962. Columbia University Press. Pp. xv + 271. Price 80s.

3. **Kallmann, F. J.** (Editor). *Expanding Goals of Genetics in Psychiatry.* New York and London, 1962. Grune and Stratton. Pp. x + 275. Price $6.75.